

## CLAIMS

What is claimed is:

- Sub B1*
1. An aqueous coating formulation containing solids, for enhancing image visualization and retention of reactive dye-based inks, comprising:
    - a) a cationic polymer or copolymer, <sup>112</sup>
    - b) a fabric softener,
    - c) urea, and <sup>112</sup>
    - d) an ingredient selected from sodium bicarbonate, sodium carbonate or combinations thereof. <sup>112</sup>
  2. The aqueous coating formulation of claim 1 wherein said cationic polymer or copolymer is present in an amount between about 5 to 95 % of the total solids. <sup>112 wt %</sup>
  3. The aqueous coating formulation of claim 1 wherein said fabric softener is present in an amount between about 5 to 20 % of the total solids.
  4. The aqueous coating formulation of claim 1 further comprising a latex binder.
  5. The aqueous coating formulation of claim 4 wherein said latex binder is present in an amount between about 0 to 80 <sup>wt</sup> % of the total solids. <sup>112</sup>
  6. The aqueous coating formulation of claim 1 wherein the sodium bicarbonate, sodium carbonate or combination thereof is present in an amount between about 3 and 10 % of the total solids. <sup>wt</sup>
  7. The aqueous coating formulation of claim 1 wherein the urea is present in an amount between about 5 and 12 <sup>wt</sup> % of the total solids. <sup>112</sup>
  8. The aqueous coating formulation of claim 1 further including additives selected from the group including wetting agents, defoamers, and surfactants. <sup>112</sup>
  9. The aqueous coating formulation of claim 8 wherein said additives are present in an amount between about 0.1 and 1 % of the total solids. <sup>wt %</sup>

Sub B8  
cont.

10. An aqueous imbibing solution, for enhancing image visualization and retention of reactive dye-based inks comprising:

- a) either sodium bicarbonate, sodium carbonate, or a combination thereof,
- b) urea.

11. The aqueous imbibing solution of claim 10 wherein either the sodium bicarbonate, sodium carbonate, or combination thereof is present in an amount of between about 30 wt% and 40 % of the total solids.

12. The aqueous imbibing solution of claim 10 wherein said urea is present in an amount of between about 50 and 70 wt% of the total solids.

13. The aqueous imbibing solution of claim 10 further including additives selected from the group including wetting agents, defoamers, and surfactants.

14. An aqueous coating formulation containing solids, for enhancing image visualization and retention of acid dye-based inks, comprising:

- a) a cationic polymer or copolymer,
- b) a fabric softener,
- c) urea, and
- d) ammonium sulfate.

15. The aqueous coating formulation of claim 14 wherein said cationic polymer or copolymer is present in an amount between about 5 to 95 % of the total solids.

16. The aqueous coating formulation of claim 14 wherein said fabric softener is present in an amount between about 5 to 20 % of the total solids.

17. The aqueous coating formulation of claim 14 further comprising a latex binder.

18. The aqueous coating formulation of claim 17 wherein said latex binder is present in an amount between about 0 to 80 % of the total solids.

19. The aqueous coating formulation of claim 14 wherein the urea is present in an amount between about 2 and 5% of the total solids.

20. The aqueous coating formulation of claim 14 wherein the ammonium sulfate is present in an amount between about 5 and 10 % of the total solids.
21. The aqueous coating formulation of claim 14 further including additives selected from the group including wetting agents, defoamers, and surfactants.
22. The aqueous coating formulation of claim 21 wherein said additives are present in an amount between about 0.1 and 1 % of the total solids.
23. An aqueous imbibing solution, for enhancing image visualization and retention of acid dye-based inks comprising:
- a) ammonium sulfate,
  - b) urea.
24. The aqueous imbibing solution of claim 23 wherein said ammonium sulfate is present between about 30 and 40% of the total solids.
25. The aqueous imbibing solution of claim 23 wherein said urea is present in an amount of between about 50 and 70 % of the total solids.
26. The aqueous imbibing solution of claim 23 further including additives selected from the group including wetting agents, defoamers, and surfactants.
27. A method of treating a substrate so as to improve the adhesion, colorfastness and washfastness of a reactive dye-based ink jet ink printed onto the substrate, which will be exposed to a post-treatment step following printing, the method comprising the steps of:
- a) providing a substrate,
  - b) treating the substrate with an aqueous coating formulation comprising a cationic polymer or copolymer, a fabric softener, urea, and an ingredient selected from sodium bicarbonate, sodium carbonate or combinations thereof.
28. The method of claim 27 wherein said cationic polymer or copolymer is present in said aqueous coating formulation in an amount between about 5 to 95 % of the total solids.

29. The method of claim 27 wherein said fabric softener is present in said aqueous coating formulation in an amount between about 5 to 20 % of the total solids.
30. The method of claim 27 wherein said aqueous coating formulation further includes a latex binder.
31. The method of claim 30 wherein said latex binder is present in said aqueous coating formulation in an amount between about 0 to 80 % of the total solids.
32. The method of claim 27 wherein said urea is present in said aqueous coating formulation in an amount between about 5 to 12 % of the total solids.
33. The method of claim 27 wherein said sodium bicarbonate, sodium carbonate or combinations thereof is present in said aqueous coating formulation in an amount between about 3 to 10 % of the total solids.
34. An article produced by the method of claim 27.
35. A method of producing a printed substrate so as to improve the adhesion, colorfastness and washfastness of a reactive dye-based ink jet ink printed onto the substrate, the method comprising the steps of:
- a) providing a substrate,
  - b) treating the substrate with an aqueous coating formulation comprising a cationic polymer or copolymer, a fabric softener, urea, and an ingredient selected from sodium bicarbonate, sodium carbonate or combinations thereof,
  - c) drying the substrate,
  - d) printing on the substrate with a reactive dye-based ink,
  - e) post-treating the printed substrate of step d).

36. A method of treating a substrate so as to improve the adhesion, colorfastness and washfastness of a reactive dye-based ink jet ink printed onto the substrate, which will be exposed to a post-treatment step following printing, the method comprising the steps of:

- a) providing a substrate,
- b) treating the substrate with an aqueous coating formulation comprising a cationic polymer or copolymer, and a fabric softener,
- c) treating the substrate of step b) with an aqueous imbibing solution of urea, and an ingredient selected from sodium bicarbonate, sodium carbonate or combinations thereof.

37. An article produced by the method of claim 36.

38. A method of producing a printed substrate so as to improve the adhesion, colorfastness and washfastness of a reactive dye-based ink jet ink printed onto the substrate, the method comprising the steps of:

- a) providing a substrate,
- b) treating the substrate with an aqueous coating formulation comprising a cationic polymer or copolymer, a fabric softener,
- c) treating the substrate of step b) with an imbibing aqueous solution of urea, and an ingredient selected from sodium bicarbonate, sodium carbonate or combinations thereof,
- d) drying the substrate,
- e) printing on the substrate with a reactive dye-based ink, and
- f) post treating the printed substrate of step e).

39. A printed substrate produced in accordance with the method of claim 35.

40. A printed substrate produced in accordance with the method of claim 38.

41. A method of treating a substrate so as to improve the adhesion, colorfastness and washfastness of an acid dye-based ink/jet ink printed onto the substrate, and which substrate will be exposed to a post-treatment step following printing, the method comprising the steps of:

- a) providing a substrate,
- b) treating the substrate with an aqueous coating formulation comprising a cationic polymer or copolymer, a fabric softener, urea, and ammonium sulfate.

42. The method of claim 41 wherein said cationic polymer or copolymer is present in an amount between about 5 to 95 % of the total solids.

43. The method of claim 41 wherein said fabric softener is present in an amount between about 5 to 20 % of the total solids.

44. The method of claim 41 wherein the aqueous coating formulation further comprises a latex binder.

45. The method of claim 44 wherein said latex binder is present in an amount between about 0 to 80 % of the total solids.

46. The method of claim 41 wherein the urea is present in an amount between about 2 and 5 % of the total solids.

47. The method of claim 41 wherein the ammonium sulfate is present in an amount between about 5 and 10 % of the total solids.

48. An article produced by the method of claim 41.

49. A method of treating a substrate so as to improve the adhesion, colorfastness and washfastness of an acid dye-based ink jet ink printed onto the substrate, which will be exposed to a post-treatment step following printing, the method comprising the steps of:

- a) providing a substrate,
- b) treating the substrate with an aqueous coating formulation comprising a cationic polymer or copolymer, and a fabric softener,
- c) treating the substrate of step b) with an aqueous imbibing solution of urea, and ammonium sulfate.

50. A method of producing a printed substrate so as to improve the adhesion, colorfastness and washfastness of an acid dye-based ink jet ink printed onto the substrate, the method comprising the steps of:

- a) providing a substrate,
- b) treating the substrate with an aqueous coating formulation comprising a cationic polymer or copolymer, a fabric softener, urea, and ammonium sulfate,
- c) drying the substrate,
- d) printing on the substrate with a reactive dye-based ink,
- e) post-treating the printed substrate of step d).

51. A printed substrate produced in accordance with the method of claim 50.

52. A method of producing a printed substrate so as to improve the adhesion, colorfastness and washfastness of an acid dye-based ink jet ink printed onto the substrate, the method comprising the steps of:

- a) providing a substrate,
- b) treating the substrate with an aqueous coating formulation comprising a cationic polymer or copolymer, a fabric softener,
- c) treating the substrate of step b) with an imbibing aqueous solution of urea, and an ingredient selected from sodium bicarbonate, sodium carbonate or combinations thereof,
- d) drying the substrate,
- e) printing on the substrate with a reactive dye-based ink, and
- f) post treating the printed substrate of step e).

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